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Increasing fruit and vegetable intake decreases inflammation in an older population

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CVD is the leading cause of morbidity and mortality in developed countries, and chronic inflammation plays a major role in its development. As CVD risk and inflammation increases with age, older people now account for the majority of CVD morbidity worldwide⁽¹⁾. Conversely, increased fruit and vegetable (F&V) intake has been suggested to correlate with reduced CVD risk⁽²⁾, although direct trial evidence of their ability to influence markers of inflammation is lacking.

To assess if increased F&V intake reduces serum amyloid-A (SAA), in serum and HDL_{2&3} and if this latter enhances the anti-atherogenic properties of HDL_{2&3}.

Subjects aged between 65 to 85 years were randomised to 2 or 5 portions of F&Vs per day, for 16-weeks (*n* = 38 per group). HDL_{2&3} were isolated by rapid ultracentrifugation. Serum-hsCRP was measured by an immuturbimetric assay, serum-IL-6, e-selectin, SAA and HDL_{2&3}-SAA were measured by ELISA procedures, and HDL_{2&3}-CETP activity was measured by a fluorometric assay.

These results demonstrated that hsCRP, IL-6 and e-selectin were unchanged following either the 2 or 5 portion interventions. However, following the 5-portion intervention, SAA significantly decreased in serum at weeks 12 and 16, in HDL₂ at weeks 6, 12 and 16 and in HDL₃ at weeks 12 and 16 (table 1), which was accompanied by a decrease in the activity of CETP in HDL₂ at weeks 6, 12 and 16 (*p* = 0.03, 0.02 and 0.001, respectively). Additionally, in the between group analyses (2 vs. 5 portions), SAA decreased in serum at week 12, in HDL₂ at weeks 6 and 16 and in HDL₃ at weeks 12 and 16 (table 1). Additionally, CETP activity decreased in HDL₂ at week 16 (*p* = 0.03).

Table 1. SAA changes and statistical differences following F&V intervention

Results were logarithmically transformed and are summarised as mean geometric change from baseline (IQ range). P1 pre vs. post 5-portion intervention: P2 between group statistics (2 vs. 5 portion change)

Week	Change in (5-portion group)			P1			P2		
	6	12	16	6	12	16	6	12	16
Serum $\mu\text{mol/L}$	0.83 (0.7, 1.1)	0.73 (0.6, 0.9)	0.76 (0.6, 1.0)	0.13	0.04	0.05	0.23	0.04	0.31
HDL ₂ $\mu\text{mol/mg protein}$	0.75 (0.6, 0.9)	0.71 (0.5, 0.1)	0.51 (0.4, 0.7)	0.01	0.02	0.001	0.01	0.08	0.001
HDL ₃ $\mu\text{mol/mg protein}$	0.86 (0.9, 1.1)	0.65 (0.5, 0.9)	0.64 (0.5, 0.9)	0.17	0.001	0.008	0.07	0.01	0.008

These results have identified: i) SAA responds to increased F&V intake, where other markers of inflammation/endothelial activation were unresponsive. ii) Increased F&V intake lowered systemic and HDL-associated inflammation, and this latter influenced the antiatherogenic properties of HDL_{2&3}. Overall, these results provide tangible evidence of the effectiveness of increasing F&V intake on inflammation and possible CVD risk in an older population.

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2. He FJ, Nowson CA & MacGregor GA (2006) *Lancet* **367**, 320–326.